

Scientific Inquiry

8-1 The student will demonstrate an understanding of technological design and scientific inquiry, including process skills, mathematical thinking, controlled investigative design and analysis, and problem solving.

8-1.3 Construct explanations and conclusions from interpretations of data obtained during a controlled scientific investigation.

Taxonomy Level: 6.3-B Create Conceptual Knowledge

Previous/Future knowledge: In 2nd grade (2-1.4), students inferred explanations regarding scientific observations and experiences. In 3rd grade, students predicted the outcome of a simple investigation and compare the result with the prediction (3-1.4) and inferred meaning from data communicated in graphs, tables, and diagrams (3-1.6). In 5th grade (5-1.6), students evaluated results of an investigation to formulate a valid conclusion based on evidence and communicate the findings of the evaluation in oral or written form. In 7th grade (7-1.6), students critiqued a conclusion drawn from a scientific investigation.

It is essential for students to know that once the results of an investigation are collected and recorded in appropriate graphs, tables or charts, the data should be analyzed to figure out what the data means.

Inferences are sometimes needed to help form a valid conclusion.

- An *inference* is an explanation of the data that is based on facts, but not necessarily direct observation.

The results of the investigation are then compared to the hypothesis. A *valid conclusion* can then be written and should include:

- The relationship between the independent variable and dependent variables based on the recorded data, and
- Whether the hypothesis was supported or not supported.

The conclusion is communicated to allow others to evaluate and understand the investigation.

It is not essential for students to understand or develop a null hypothesis.

Assessment Guidelines:

The objective of this indicator is to *construct* explanations and conclusions from interpretations of data obtained during a controlled scientific investigation; therefore, the primary focus of assessment should be to produce an explanation or conclusion for an investigation. However, appropriate assessments should also require students to *interpret* and *analyze* data collected in an investigation; *recognize* a valid conclusion for a given investigation; *compare* a conclusion to the appropriate investigation; *compare* the conclusion with a given hypothesis; or *select* an appropriate conclusion for a given investigation.